



#8/A
T. Young
1-19-05

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Serial No.: 10/040,751)	
)	
Inventors: Rediniotis et al)	Ex. A. Ellington
)	
Title: Embedded Sensor Multi-Hole Probe)	Art Unit 2855
)	
Action Date: Sept. 5, 2002)	

Honorable Commissioner of Patents
2011 So. Clark Place
Crystal Plaza 2, Room 1 BO 3, Mail Room
Arlington, VA 22202

Response to Non-final Office Action

Now comes applicants, and through the undersigned, their attorney of record
respond to the Office action as follows:

The Examiner has required a new declaration which is submitted herewith. It
complies with 37 CFR 1.67(a) by identifying this application by Serial number and filing
date. It also contains reference to the Provisional application which the Examiner
required. In addition, the word "willful" has been added to the false statement clause.

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A certified copy of the provisional application has been provided from the certification center in the Patent Office.

As the case was unintentionally abandoned, a Petition to Revive with its accompanying fee and a Request for an Additional Three Months with its accompanying fee is submitted herewith.

The Examiner notes a claim to foreign priority under the heading "Priority". No claim to foreign priority is made, only a claim to an earlier filed provisional application which was identified and which was filed in the USA on Jan. 12, 2001. Again, the new oath identifies the earlier filed provisional and relies upon that date of filing. A copy of the certified copy of the earlier filed provisional is enclosed herewith as requested by the Examiner.

The Examiner has also objected to the lack of copies of prior art being filed with Form 1449. Despite the fact that these references are available immediately on-line to the Examiner, copies of the references are submitted herewith. The Examiner also complains about the lack of inventors names on Form 1449! She will be heartened by the submitted list although the names are on the patent copies and the undersigned is aware of no legal requirement that the names be listed.

The Examiner has also complained about the specification stating that the prior art references mentioned were not listed on Form 1449. She is mistaken as a quick review of the patents discussed in the spec to correlate it with the patents listed on Form 1449 will reveal.

The Examiner has rejected claims 1-12 and 18-20 under 35 USC 112, as being indefinite for failing to particularly point out the subject matter which is regarded as inventive. This is addressed in the amendments to the claims and as follows:

Claim 1 has been amended to more clearly define the invention and the probe tip description has been changed to a “spherical, non-solid” tip to both eliminate the indefiniteness and to define it over Gerardi. In addition, the word “quick” has been eliminated and the word “instantaneous” submitted therefore with an accompanying description of the close proximity of the transducers and the sensors.

In claim 5 the holes are now described as “adjacent” the tip of the probe.

In claim 10, the recitation of the sensors has been changed to describe a “number of sensors” so as to correlate with the following recitation concerning a “corresponding number of pressure transducers”.

In claim 12 the probe is now described as less than 1.5mm and the term “minature” which the Examiner objected to has been deleted.

Claim 19 has been cancelled to remove the claim from consideration and the Examiner’s objections.

Thus, it is believed that all the Examiner’s objections to the claims under 35 USC 112 have been obviated by the amendments to the claims.

102 rejections

The Examiner has rejected claims 13 and 14 under 35 USC 102 (b) as being anticipated by Gerardi. The patent to Gerardi shows an omnidirectional aerodynamic sensor which is used to detect the nature of fluid flow. An omnidirectional sensor is shown which comprises an omnidirectional drag force inducing probe coupled with a force transducer and a signal processor. Force are initially detected by the probe and transmitted to the transducer. The output of the transducer is processed by the signal processor in order to determine the angle of attack as well as wind speed and direction. It should be noted that the tip of Gerardi's probe is solid and unlike those of the instant invention which can be spherical, conical and instrumented which Gerardi's probe is not. Gerardi's probe functions differently as well in that the instant invention responds to changes over the surface of the tip using pressure sensors which are located right at the tip while Gerardi uses sensors which are strain gauges placed very far from the tip. Gerardi uses a diaphragm sensor which is different.

Gerardi requires a large force to generate readings on the sensor diaphragm which requires high speeds and large spheres. The sphere of Gerardi could never be scaled down to the size of a few millimeters and still be able to record mVolts output from strain gauges, it just is not possible. With MEMS sensors, the instant invention can easily be scaled down to the order of one millimeter and still record at the required level.

Another reason for not using Gerardi is that his diaphragm will interfere with the flow. Thus, one could not take general statements about the prior art and somehow, miraculously, come up with the instant invention. Gerardi does not show what the Examiner purports it shows and her argument that one could use Gerardi is not supportable by a detailed analysis of Gerardi.

If one were to mount the device of Gerardi on an airplane, the sensor diaphragm could, admittedly, be incorporated into the body of the aircraft but the device will not work for the scientific measurement of air or water speed over and around immersed bodies as shown and described since the flat plate normal or nearly normal to the oncoming stream of air will therefore interfere with the flow and introduce large errors. Contrary to Gerardi, the instant device is slim and streamlined and will not interfere with the flow. There is no teaching in Gerardi to make his device so slim and streamlined.

The Gerardi device may be accurate enough for the purpose for which it was designed but it is clearly inadequate for the purpose of the instant invention, i.e., as a scientific instrument. This is so due to Gerardi being based on the principles of steady drag. His figure 13 presents the drag coefficient as a function of the Reynolds number but this is for steady flow. However, the drag coefficient deviates from its steady values if the flow fluctuates. This is due to the development of the wake downstream, i.e., in the dead air region on the lee side of the sphere. This takes time to form and reform and the direction of the wind is constantly changing and Gerardi's device cannot

adapt while the instant invention responds instantly to changes in flow direction.

The claims have been amended in part to differentiate them from Gerardi where there might be a misreading of the claims as anticipated by the reference but the claims that clearly distinguish are left as it.

The Examiner goes on to reject claims 18-20 under 35 USC 102(a) as being anticipated by the emitted prior art. The undersigned does not know what the Examiner means by the “emitted” prior art. No name or patent number is cited. A copy of the Office action is submitted herewith with the area on page 5 noted in red. Perhaps the Examiner can throw some light on what she meant by this rejection. Does she refer to Gerardi? The undersigned assumes she is referring to statements within the specification of the instant case and will proceed to argue those accordingly.

While the Examiner refers to the “emitted” art as anticipatory and suggestive of the invention, there is no explanation of what type of device she is referring to. What would such a “ghost” device look like? It is impossible to tell by mere references to the specification’s recitals. All the specification does is relate that certain aspects of the technology are known generally but makes no reference to specific devices. This rejection is impossible to respond to in detail as there is no “teaching reference” to address.

103 rejection

The Examiner goes on to reject claims 1-12 and 15-17 under 35 USC 103(b) as

being unpatentable over the “emitted” prior art in view of Amazeen et al and Gerardi. Again, we are left in the dark as to what she refers to as the “emitted” prior art. One again assumes that the Examiner is referring to various statements in the instant specification and will argue accordingly. The same argument as to the lack of a teaching reference is repeated here as there is no suggestion of the desire or need to modify a “teaching reference” which does not exist. One cannot just state that all this is just “obvious” which is what this rejection amounts to. How would the prior art be modified to anticipate the claims? Just because the specification states that five and seven sensor probes have been used before does not even begin to attain the status of a teaching reference. In all the prior art, long pressure tubing has been used and the instant invention eliminates those problems by locating the transducers adjacent the probe tip. If this were obvious, why has no one done it before? Evidently it did not suggest itself to others and was not obvious. What is happening here is that there is a constant change in pressure flow resulting in changes in pressure. Heretofore, none of the prior art devices could keep up with it. As stated, in the past, multi-hole probes have only been used for steady state measurements that do not change or change very slowly over time. What is the configuration of the base reference the Examiner is trying to modify with Amazeen and Gerardi? And where is the suggestion to do it. Both the references cited are different in purpose and configuration as has been described and the “ghost” combination reference remains a “ghost” with no definition.

The inadequacies of the teaching of the Gerardi device have already been discussed but the Amazeen reference fails as a teaching reference as well. All that this

reference shows is a very sensitive small surface that can record minute forces exerted by contact with it. It has an entirely different purpose than that of the instant invention and Amazeen has no teaching of using his tactile sensor on the tip of a probe to measure wind speed. Even if one could, arguendo, so use Amazeens sensor, it could not measure wind direction because the silicon transducer he uses are mounted on a flat plate. The instant sensors must be mounted on curved surfaces to be able to distinguish wind direction and the claims now call for that limitation. A very elaborate calculation must be performed to convert surface pressure to wind velocity and wind direction and Amazeen discloses no such sensors and calculations. It is only a robotic device that can be simulate the human sense of touch.

The reference to Honda shows a device similar to the Gerardi device. It too is a solid sphere attached at the end of a sting and a sensor on the base of the sting responds to the drag force exerted on the sphere by the wind. The only difference is that the reading of the forces is done by another type of electrical signal. This invention is almost identical to Gerardi. It is more limited in the directions it can sense because it measures only the tendency of the sting in bending. It therefore measures only velocities in directions normal to the sting. Moreover, it must suffer from poor response to unsteady loads just like the Gerardi probe.

Nakaya et al shows another probe which is different from the instant invention in that it places the sensors at the tip of the probe while calibrating the response thereto to return the instantaneous magnitude and direction of flow and thus detect and accurately

track unsteady flows with a high frequency response.

The Maiden device requires that a probe is turned mechanically seeking the actual direction of the flow and only then can it produce a reading. This requirement delays its response greatly as it takes some time for the probe to be rotated to the proper position. Moreover, the rotating gears and housing make the device bulky and therefore will introduce flow interference. Furthermore, the pressure sensors are far from the tip.

As a review of the amended claims will reveal, they now clearly define over the prior cited art and an early indication of allowability and passage to issuance is earnestly solicited. If the Examiner should agree and have only minor issues to discuss with the undersigned she is respectfully requested to call him to work them out by Examiner's amendment. The undersigned also suggests an interview with one or more of the inventors which may assist the Examiner in her understanding of this difficult area of science. The undersigned will be glad to arrange such an interview at a time to accommodate the Examiner's schedule. The Examiner is requested to call the undersigned before acting on the claims to afford an opportunity for all to arrive at a satisfactory claim format.

Submitted herewith, on separate sheets, are amended claims 1- 20.

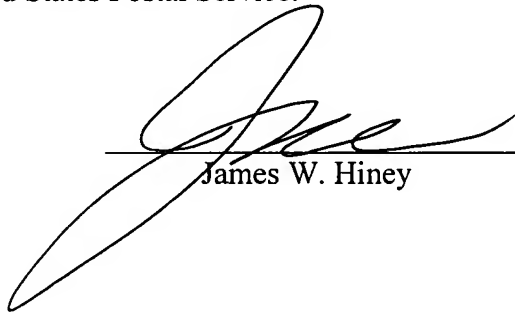
Respectfully submitted,

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Enclosures:

Certification of Mailing

I, James W. Hiney, do hereby certify that an executed original of this response, together with a Petition to Revive, a Request for Three additional Months in which to respond, and two checks to cover the fees for the Petition and Request, and copies of the cited art on Form 1449 and a certified copy of the Provisional patent upon which reliance is made, was deposited, Express Mail postage prepaid, this ~~31~~³⁷th day of October, 2003, with the United States Postal Service.



James W. Hiney